



IDEM's Surface Water Quality Assessment Program

Trace Metals Project

Program Objective

Recently, under the Great Lakes Initiative (GLI), Indiana has adopted dissolved metal criteria for the Great Lakes Basin. To meet compliance to the new criteria for dissolved metals, data are required to assess surface water quality; historically, only total recoverable metals have been monitored. Therefore, there is an immediate need in the Assessment Branch for the implementation of Clean Sampling Techniques (Method 1669) in conjunction with ultra-clean low detect metals analyses (EPA Method 1638, 1636, 1631, 1630, and others). The main objective of this project is to gather trace metals data for both dissolved and total recoverable metals at nanogram levels (parts per trillion, ppt) using clean sampling and ultra-clean analytical techniques.

Program Participants

This program will be operated through the sampling efforts of the Surveys Section of the Assessment Branch and through support of the selected Contract Analytical Laboratory.

Program Description

<i>Media:</i>	<i>Surface water (rivers and streams)</i>
<i>Study Area:</i>	<i>Statewide targeted sampling locations</i>
<i>Sampling Sites:</i>	<i>Twenty- four locations</i>
<i>Sampling Frequency:</i>	<i>Samples will be collected quarterly, 8 locations per month time frame</i>
<i>Data Collected:</i>	<i>Nineteen metals, seventeen non-metals, and field parameters</i>

Program Product(s)

- Develop expertise in using Clean Sampling Methods.
- Collect both Total and Dissolved Metals data statewide at nanograms levels (parts per trillion, ppt).
- Identify dissolved and total mercury and methyl mercury concentrations.
- Sampling and Analysis Work Plans.
- QA/QC Review Reports.
- Yearly Report

Technical Notes

Statewide, twenty-four strategic rivers and stream sites have been selected for this project and each sampling site is near a USGS gaging station. The sampling and data collection efforts are timed to be quarterly in order to capture metals concentrations during the four seasons of the year. Both total and dissolved metals concentrations will be determined in the surface water samples.

Metals

Aluminum	Cadmium	Lead	Selenium
Antimony	Chromium	Manganese	Silver
Arsenic	Chromium (VI)	Mercury	Thallium
Barium	Copper	Methyl Mercury	Zinc
Beryllium	Iron	Nickel	

Alkalinity	Cyanide, Free	Kjeldahl Nitrogen, Total	Sulfate
Ammonia-Nitrogen	Cyanide, Total	Nitrate+Nitrite-Nitrogen	Total Dissolved Solids
Chemical Oxygen Demand	Fluoride	Organic Carbon, Total	Total Solids
Chloride	Hardness	Phosphorus, Total	Total Suspended Solids

Dissolved Oxygen	pH	Turbidity	Water Temperature	Specific Conductance
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Field work will follow EPA Method 1669, “Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels.” In this method, measures are taken to avoid exposing a sample to any possible source of metal contamination, including atmospheric deposition, by using non-metallic materials for the collection of the sample and by following a rigorous protocol for the actual sampling procedure. It requires a “clean hands and dirty hands” technique, which requires at least two or more staff for sampling.

Trace Metals Sampling Locations for 2001



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